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Age of Education Infrastructure: Recent Trends

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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
p	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
E	use with caution
F	too unreliable to be published

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Age of Education Infrastructure: Recent Trends

by Valérie Gaudreault, Donald Overton and John Trstenjak

1 Summary

On the whole, the average age of Canada's education infrastructure—its elementary and secondary schools, universities and colleges—has fallen slightly since the early 2000s after nearly doubling during the previous three decades.

In 2008, the nation's education infrastructure was an estimated 20.1 years old on average, slightly below the peak of 21.3 years in 2000. This decline was fuelled largely by new investments in university buildings, mainly in Ontario and Quebec.

Education buildings were at their youngest in 1969 when the average age hit 11.0 years following huge investments in new facilities to accommodate a large inflow of baby boomers.

The average increased rapidly until the mid-1980s. The need for new construction or major renovations was less pressing because many buildings were relatively new. In addition, fertility rates were declining during the baby bust, and baby boomers were entering the labour force.

From the mid-1980s to the turn of the millennium, the average increased, but at a slower pace. New investments were required to accommodate the children of the baby boomers (the so-called "echo boom"). These children were entering primary and secondary schools in large numbers, but investments were not sufficient to maintain or reduce the average age. This cohort and an increase in enrolment rates boosted demand for postsecondary educational services around the turn of the millennium.

A reduction in the average age indicates a general trend toward younger stock of capital. It doesn't necessarily imply that each physical asset is younger or in better condition, or that a greater proportion of assets meet specific quality standards. One of the key factors is the amount of investment. The more the investment, the younger the stock.

On average, the service life of education buildings is estimated at about 40 years. The average of 20.1 years in 2008 means that education physical infrastructure have passed 51% of their useful service life. This is lower than other major infrastructure assets, such as bridges and overpasses, which have passed 57% of their useful life, highways and roads (53%) and wastewater systems (63%). However, it is significantly higher than water supply systems (40%).

In 2008, the gross stock of education facilities amounted to $115.5 billion, nearly half of all the nation's institutional infrastructure.[1]

Elementary and secondary schools combined represented the largest proportion of total education stock, 61% or $70.7 billion. As a result, these buildings are the major determinant of the average age of education buildings. However, in recent years, higher investments in education buildings have targeted postsecondary institutions. From 2000 to 2008, the stock of elementary and secondary schools rose 1.0% a year on average, compared with 2.1% for colleges and 3.9% for universities.

Universities accounted for 24% of education infrastructure in 2008, the second largest proportion.

1 Unless otherwise indicated, all gross capital stock estimates are reported in 2002 constant dollars.

In 2008, education infrastructure was older than the national average in seven provinces: New Brunswick, Newfoundland and Labrador, Quebec, Manitoba, Nova Scotia, Prince Edward Island and Saskatchewan. In Ontario, the age equalled the national average, thanks to strong investments in recent years. British Columbia and Alberta had the youngest education infrastructure in the country. This was due partly to large investments made to accommodate large cohorts of international migrants (mostly to British Columbia in the 1990s) and interprovincial migrants (mostly to Alberta in the 2000s).

This study provides a first look at recent trends in the average age of education buildings in Canada and the provinces. It compares the average age with the useful life of education buildings at the elementary-secondary, college and university levels.

Data source and key concepts

Data source

Data in this study come from the Capital and Repair Expenditures Survey,
http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=2803&lang=en&db=imdb&adm=8&dis=2.
Average age and useful service life data are derived based on a formula that uses data from the same survey.

Data in this paper are presented for Canada and for each province separately. Unless otherwise indicated, data for the Yukon Territory, the Northwest Territories and Nunavut are included in the Canada total but are not presented separately.

Education infrastructure

For the purpose of this paper, education infrastructure comprises elementary and secondary schools (including vocational and technical institutes), colleges, universities and all other educational buildings coded under the *Educational Services* category in the North American Industry Classification System (NAICS). Investments in these infrastructure assets are financed for the most part by federal, provincial, and local governments but may also include private sources. Investment represents spending on assets for renovating, upgrading and expanding existing stocks. Such assets generally have a service life of more than one year and include new fixed capital formation and investment in replacement assets. The value of an asset is discarded from the value of the gross stock at the end of its useful service life.

Useful service life

The useful service life of an asset is its estimated productive life, that is, the length of its useful life at the time of its acquisition. For example, based on 1961 to 2008 data, an institutional building has a mean useful service life of about 40 years. The useful service life is an average based on data from the Capital and Repair Expenditure Survey and has been confirmed by empirical studies that link the value of gross stock with asset useful life and other engineering information. The survey also provides data on the age-price profiles of discarded assets. Service life and useful life are used interchangeably in this report.

For more information on how Statistics Canada computes the useful service life and average age of assets, please see Statistics Canada, Investment Flows and Capital Stocks – Methodology 2001, *http://www.statcan.gc.ca/imdb-bmdi/document/2820_D1_T9_V1_B.pdf*.

Average age of capital stock

To estimate the average age of capital stock Statistics Canada uses a model which includes the annual investment by type of asset and the year in which the investment was made, the survival function, and the year-end gross capital stock. Without sufficient new investment, the age of the infrastructure increases. In the case of education infrastructure, the model assumes that after reaching their average useful service life of about 40 years, investments are discarded from gross capital stock. This tends to lower the average age.

One way to understand the average age of infrastructure is to make a parallel with the average age of a population, which depends on births, deaths and the age distribution. New investments are like births adding to the stock and lowering its average age, while past investments are subject to the ageing process, which progressively increases the stock's average age, and eventually reach the end of their useful life, resembling deaths, which depletes the stock.

In practice, there can be several different age distributions for a given average age. For example, there can be structures whose ages are clustered around the average age, or a combination of young structures with much older structures.

Average age as a percent of useful life

The ratio of the average age over the useful service life provides a relative measure of the amount of useful life expended for a given set of assets.

Data limitations

A reduction in the average age indicates a general trend toward younger stock in overall assets. It does not imply necessarily that each physical asset is younger or in better conditions or that a greater proportion of assets meet specific quality standards.

The amount of investment and the corresponding average age that would be required to ensure that all assets comply with a given quality level can only be determined based on appropriate engineering methods and in consideration of public health and safety regulations.

2 Education infrastructure is a little younger after decades of ageing

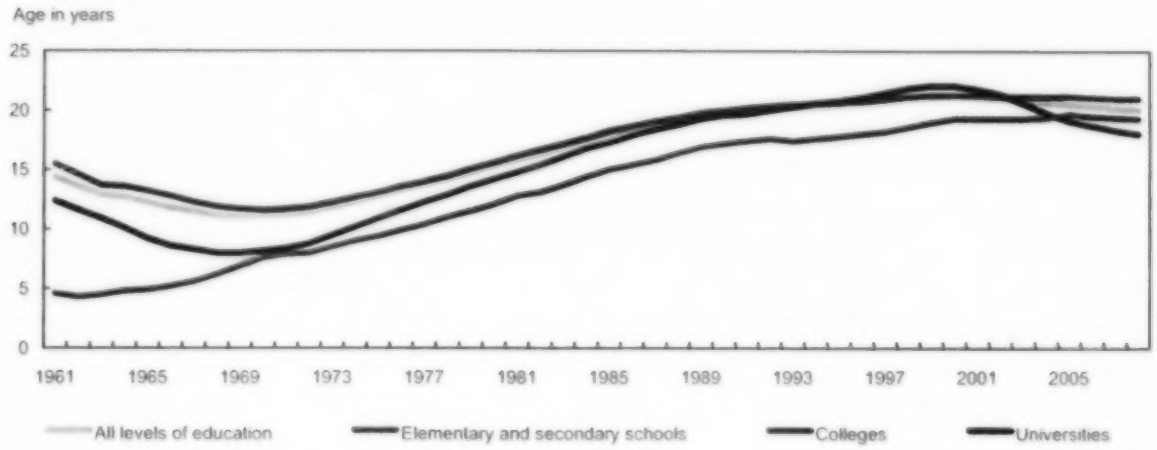
On the whole, the average age of Canada's education infrastructure has fallen slightly since the turn of the millennium after nearly doubling during the previous three decades.

In 2008, it reached 20.1 years, down from its peak of 21.3 in 2000. This recent trend was fuelled largely by renewed investments in university buildings mainly in Ontario and Quebec.

In general, new investments in education capital stock take the form of new construction and major alterations or additions to existing facilities. At the same time, investments that have passed their useful life are being discarded from the value of the gross capital stock. These two factors determine to a large extent the changes in the average age of education infrastructure.

Overall, a reduction in the average age indicates a general trend toward younger stock of capital. It does not necessarily imply that each physical asset is younger or in better condition or that a greater proportion of assets meet specific quality standards.

Chart 1
Large capital investments in universities since 2000 have lowered the average age of education infrastructure



Source(s): Statistics Canada, special tabulation, Investment and Capital Stock Division.

In the case of the elementary and secondary level of education, new investments in school building and renovations barely offset the value of discarded assets from 2000 to 2008. Gross stock increased from $65.3 billion in 2000 to $70.7 billion in 2008 while the average age of elementary and secondary education infrastructure stayed more or less constant during the period.

For postsecondary education, new investments had a greater impact on the average age because they amounted to 2.7 times the amount of discarded investments during the period. This is so because, in general, investments in colleges and universities are relatively more recent compared with those made for elementary and secondary schools. Noticeably, gross capital stock invested in university infrastructure amounted to $27.4 billion in 2008, of which $10.8 billion was new investment that occurred since 2001.

Education buildings were at their youngest in 1969 when the average age hit 11.0 years following huge investments in new facilities to accommodate a large inflow of baby boomers. The average age increased rapidly until the mid-1980s as the need for new construction or major renovations was less pressing due to the fact that many buildings were relatively new. Also, fertility rates were declining (baby bust) and baby boomers were moving into the labour force.

From the mid-1980s to the turn of the millennium, the average age continued to increase, but at a slower pace. New investments were required to accommodate the children of the baby boomers (echo boom) who were entering

primary and secondary schools in large numbers, but were not sufficient to maintain or reduce the average age. By the turn of the millennium, the average age of education infrastructure had risen to 21.3 years, the highest level since the inception of the series in 1961.

On average, the service life of education buildings is estimated at about 40 years. This means that, in 2008, investments in education physical infrastructure passed 51% of their useful service life. This is lower than for other major infrastructure such as bridges and overpasses (57%), highways and roads (53%) and wastewater systems (63%), but significantly higher than water supply systems (40%).[2]

3 Education buildings: 6.8 million students and 1.2 million staff

Education buildings are an important component of the country's institutional infrastructure.[3] They are crucial for the education of more than 6.8 million students and for the jobs of 1.2 million educational and non-teaching staff.[4,5] But they require significant investment and maintenance resources.

In 2008, the value of the gross stock of capital in these facilities amounted to $115.5 billion. This represented almost half of all institutional infrastructures in Canada.

In recent years, the status and ageing trends of infrastructure in Canada has been the subject of much attention in the media and in government reports.[6] Large investments have been made since 2000 to rejuvenate roads, bridges and other transportation structures. Recent federal and provincial budgets have contained numerous and substantial investment programs to further expand and improve public infrastructure, including schools, colleges and universities.

4 Population growth and age distribution: Major factors behind investment and ageing trends

Since investments in capital stock in the education sector take primarily the form of construction and major renovations or alterations of building space, the need for investment is closely determined by the demand for educational services. When the demand grows due to increases in the school-age population or because participation in postsecondary education rises, new investments must be made to expand physical capacity. When added to the stock of existing facilities, these new investments tend to lower the average age of the gross stock. At the same time, after reaching their usual useful service life, investments made some 40 years ago are discarded from gross capital stock. This also tends to lower the average age.[7]

In addition, over time, ageing infrastructure must be replaced or renewed. Demographic trends may dictate a need for expanding or reducing capacity in some areas. Certain provinces show faster population growth and a younger population than in other parts of the country, prompting a need for more investment in education infrastructure in these jurisdictions.

2 See Mychèle Gagnon, Valérie Gaudreault and Donald Overton, "Age of Public Infrastructure: A Provincial Perspective," *Analysis in Brief*, no. 67, February 2008, Statistics Canada catalogue no. 11-621-M, *http://www.statcan.gc.ca/pub/11-621-m/11-621-m2008067-eng.htm*, Ottawa.

3 Institutional buildings include schools, colleges, universities, hospitals, health centers, clinics and other health care, nursing homes, homes for the aged, daycare centers, churches and other religious buildings, libraries, historical sites, penitentiaries, detentions centres, courthouses, museums, science centres, public archives, fire stations and halls, armouries, barracks, drill halls, and other military structures.

4 All enrolment data in this study were produced by the Economic Analysis Group. For more details on the methodology to estimate enrolment by levels of education, see text box "Estimation of education enrolment."

5 Source: Statistics Canada, CANSIM table 281-0024.

6 See Valérie Gaudreault and Patrick Lemire, "The Age of Public Infrastructure in Canada," *Analysis in Brief*, no. 35, January 2006, Statistics Canada catalogue no. 11-621-M, *http://www.statcan.gc.ca/pub/11-621-m/11-621-m2006035-eng.htm*, Ottawa and Francine Roy, "From Roads to Rinks: Government Spending on Infrastructure in Canada, 1961 to 2005," *Insights on the Canadian Economy*, no. 19, February 2008, Statistics Canada catalogue no. 11-624-M, *http://www.statcan.gc.ca/pub/11-624-m/11-624-m2008019-eng.htm*, Ottawa.

7 In practice, if no new or discarded investments are recorded in a given year, the average age will increase by one year. The amount of new or discarded investments that would be required to hold the average age of the capital gross stock constant can only be determined by accounting for the actual distribution of investments made over the years. For the purpose of this paper, changes in the average age are mainly analyzed in terms of the size of new and discarded investments on an annual basis.

For example, Alberta has had the fastest growing population in every year since 2000. It has consistently shown the second youngest average age of education infrastructure among provinces.

Other factors also have an impact on the need for investment. They include the amount of gross stock per student, the different types of investments (construction, equipment, furniture, etc.) and the space utilization rate (use of facilities during day, night, week-ends and summer seasons). Their relative importance will vary according to the level of education and the type of educational services provided.

For example, primary schools essentially require classroom space, technical and vocational schools have mechanical and tool shops and universities operate laboratories and research centres. In 2008, the amount of gross stock per student at the postsecondary level was more than twice the amount at the elementary and secondary level.

In total, the value of the gross capital stock in constant dollars invested in education infrastructure grew by 1.7% a year on average from 2000 to 2008. During this period, enrolment at all levels of education was more or less stable overall. This resulted in an average 1.8% increase a year in the amount of gross stock per student and a very slight lowering of the average age. This growing trend in the amount of stock per student has been consistent since 1981 (+1.3% a year on average from 1981 to 2008, the latest year for which a complete set of data is available).

At the elementary and secondary levels, student enrolment declined 0.6% a year on average from 2000 to 2008 while gross stock at this level increased 1.0% a year on average during the same period. This corresponds to an average annual increase of 1.7% in the amount of stock per student, not enough to lower the average age. From 1981 to 2008, gross stock per student at this level increased 1.4% a year on average.

Unlike the elementary and secondary level, the value of the infrastructure gross stock per student at the postsecondary level declined 0.5% a year on average from 1981 to 2008, as enrolments outpaced investments. Colleges and universities recorded relatively high growth in enrolment since 1981, the year when university participation rates started to climb. Postsecondary enrolment increased 3.0% a year on average during the period. This rise in enrolment triggered new investments which, coupled with low discard rates, contributed to a 2.4% average annual increase in the value of infrastructure gross stock at that level during the period. This trend also ultimately reduced the average age of the gross stock.

Estimation of education enrolment

Because there is no complete time series on full-time and part-time enrolment for all levels of education, education enrolment had to be estimated for the purpose of this paper using the following methodology and data sources.

Elementary and secondary level

Enrolment for this level was arrived at by adding the following two components: (1) annual data on the number of individuals aged 5 to 14 estimated by Demography Division of Statistics Canada; (2) annual data on number of individuals aged 15 to 19 attending a school, college or university according to the Labour Force Survey (LFS) and who were deemed to be enrolled at the elementary and secondary level according to the methodology described in the Allocation by level of education section described below.

Postsecondary enrolment

Enrolment for this level was arrived at by adding the following two components: (1) the number of individuals aged 15 to 19 attending a school, college or university according to the LFS and who were deemed to be enrolled at the postsecondary level according to the methodology described in the *Allocation by level of education* section described below; (2) the number of individuals aged 20 to 29 attending a school, college or university according to the LFS. The 20 to 29 age group is considered to be the regular age-group for college and university attendance and they account for the majority of total postsecondary enrolment.

Allocation by level of education

Since the LFS does not capture the level of education of those individuals attending a school, college or university, the following ratio was applied to the total number of students aged 15 to 19 from the LFS to estimate the number of students enrolled in elementary and secondary schools.

Ratio = (A - B)/C where:

(A) = total annual number of full-time and part-time students in public elementary and secondary and private schools from administrative data published by the Centre for Education Statistics at Statistics Canada from 1999/2000 to 2005/2006;

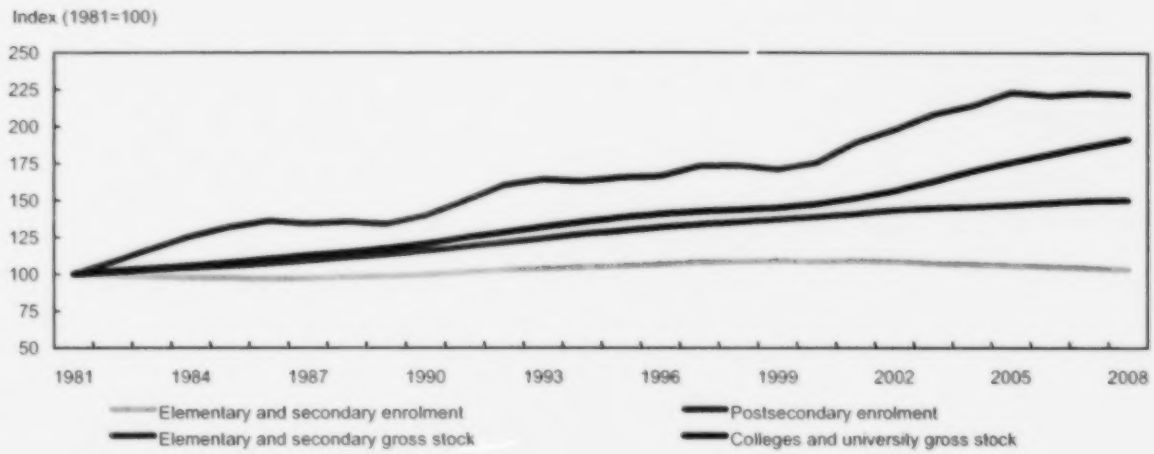
(B) = individuals aged 5 to 14 according to annual population estimates produced by Demography Division from 1999 to 2005 (CANSIM table 051-0001);

(C) = annual aggregate estimates from the LFS for the number of students aged 15 to 19 at all levels of education from 1999 to 2005 (CANSIM table 282-0095).

This ratio provides an estimate of the proportion of 15 to 19 year-olds who were enrolled in public elementary and secondary schools in any given year; the balance of 15 to 19 year-olds who were attending school according to the LFS would be considered as students at the postsecondary level.

The ratio was calculated for each year from 1999 to 2005 and was applied to the corresponding total number of students aged 15 to 19 from the LFS; because consistent statistics for component (A) above are not available for years other than 1999 to 2005, the ratio for years prior to 1999 was based on the 1999 ratio and the ratio for years after 2005 was based on the 2005 ratio.

Chart 2
Postsecondary enrolment is a major investment driver



Source(s): Statistics Canada, special tabulation, Economic Analysis Group, Business and Trade Statistics Field.

5 Elementary and secondary schools: Largest component of education infrastructure

In 2008, elementary and secondary schools together represented the largest proportion of the total gross stock at $70.7 billion or 61% of all education infrastructures. As such, elementary and secondary schools are the major determinant of the average age of education buildings.

However, in recent years, higher investments in education buildings have especially targeted postsecondary institutions. From 2000 to 2008, stock in elementary and secondary schools have increased 1.0% a year on average compared with 2.1% for colleges and 3.9% for universities. As a result, the share of infrastructure stock accounted for by elementary and secondary schools dropped from 65% to 61% during the period. Excluding universities, the average age of education buildings would have remained constant since 2000.

In fact, the average age of elementary and secondary schools has been fairly stable at the national level since 1996. It increased slightly in the 1990s, then retreated thereafter. In 2008, the average age of elementary and secondary schools in Canada stood at 21.0 years or 53% of their estimated useful life.

6 Canadian universities: Youngest education infrastructure

At 24%, universities accounted for the second largest component of the gross education infrastructure stock in 2008. Starting in 2000, university infrastructure stocks experienced a marked increase, reaching a value of $27.4 billion in 2008.

The rapid increase in the value of university capital stock was reflected in the growth of the value of building permits issued for major renovation and construction in the university sector.[8] The value of building permits for universities increased 10.7% a year on average from 2000 to 2008. In contrast, the value of building permits for elementary and secondary schools remained virtually unchanged during the period.

8 Source: Statistics Canada, Building Permits Survey.
http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=2802&lang=en&db=imdb&adm=8&dis=2

This resulted in a lowering of the average age of the university infrastructure from 22.1 years in 2000 to 18.0 years in 2008, making it the youngest among all education infrastructures.

Three changes were partly responsible for this trend. Ontario universities had to invest to cope with a double cohort of students in the 2000s resulting from the elimination of the secondary school Ontario Academic Credit year. Quebec universities increased their infrastructure investments, as the Government of Quebec launched several initiatives to support capital investments in universities.[9] British Columbia created a new university in the northern part of the province and gave degree-granting status to many colleges across the province in the 1990s in an effort to increase the physical accessibility of universities to students outside Vancouver and Victoria.[10]

Nationally, the average age of the university infrastructure stood at 45% of its useful life in 2008.

7 Age of college infrastructure continues to rise

Colleges were the third largest component of education infrastructure, accounting for 10% of gross stock in 2008. Their proportion has risen almost uninterrupted since the early 1960s when the community college system was introduced widely in the country.

However, the rate of growth in investments in college infrastructure has slowed in recent years. Its average age rose to 19.7 years in 2005; by 2008, it had slipped to 19.3 years.

8 New construction accounts for the largest share of investment

Investments in education infrastructure can take various forms depending on needs and the amount of resources available. Construction of new buildings or additions may be required to accommodate growth or to replace old buildings that have outgrown their useful life. Major alterations or improvements to existing structures are also considered as capital investments and also contribute to lowering the average age.

Nationally, between 2000 and 2008, new construction, as measured by the Building Permit Survey, accounted for more than half of all major capital projects over the three levels of education. Additions, and alterations and improvements each accounted for less than a quarter of investments.

Elementary and secondary schools allocated more than the average to new construction and less to alterations and improvements. Conversely, universities and college construction spent less than the national average on new construction and a larger share to other work.

9 The Government of Quebec's credits for capital investments in education increased 7.8% a year on average between fiscal year 2000-2001 and fiscal year 2008-2009 (see Secrétariat du Conseil du trésor, *2009-2010 Expenditure Budget*, *http://www.tresor.gouv.qc.ca/en/budget/09-10/index.asp* (accessed August 26, 2009)). For initiatives related to universities, see Ministère de l'Éducation, du Loisir et du Sport, *Financement et mesures budgétaires et fiscales*, *http://www.mels.gouv.qc.ca/ens-sup/ens-univ/finances-univ.asp* (accessed August 26, 2009).

10 See Klarka Zeman, "If you build it, they will come: The impact of new university on local youth," *Education Matters: Insight on Education, Learning and Training in Canada*, Statistics Canada Catalogue no. 81-004-X, vol. 3, no. 5, February 2007, *http://www.statcan.gc.ca/pub/81-004-x/2006005/9589-eng.htm*, Ottawa.

Table 1
The majority of capital investments in education infrastructure went to new construction between 2000 and 2008

	New construction	Additions	Alterations and improvements	Total
	percent			
Elementary and secondary schools	58	22	20	100
Colleges	48	24	28	100
Universities	51	24	26	100
Total	**54**	**22**	**24**	**100**

Source(s): Statistics Canada, special tabulation, Building Permit Survey, Investment and Capital Stock Division.

9 Education infrastructure older in seven provinces

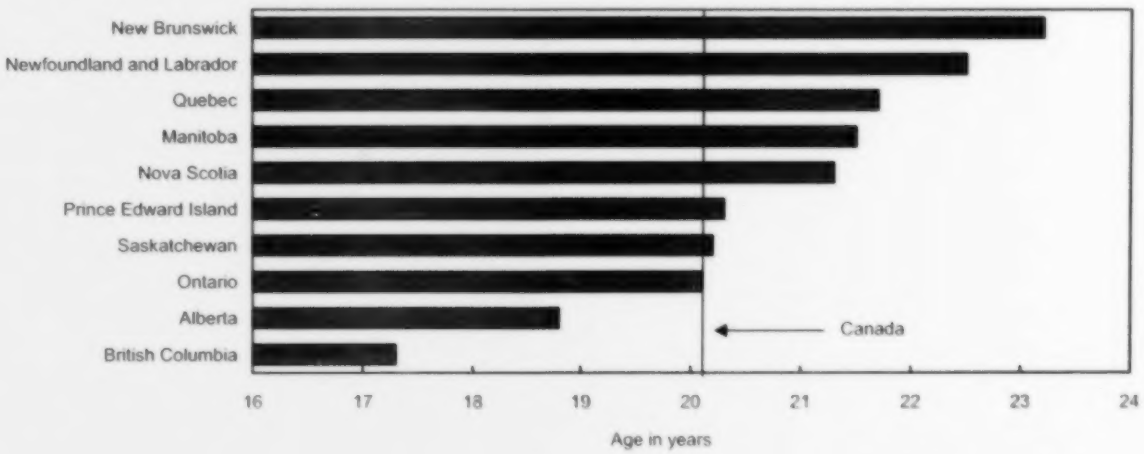
In 2008, the average age of education infrastructure exceeded the national average in seven provinces: New Brunswick, Newfoundland and Labrador, Quebec, Manitoba, Nova Scotia, Prince Edward Island and Saskatchewan.

In the case of Ontario, the average age was equal to the national average. This was due to strong investments in its education infrastructure in recent years, especially at the university level following the graduation of a double cohort of secondary school students resulting from the elimination of the Ontario Academic Credit year.

British Columbia and Alberta had the youngest education infrastructures in the country. The relatively younger age of British Columbia's infrastructure was due partly to large investments in the early 1990s to accommodate large cohorts of immigrants from other countries as well as an important influx of people from other provinces. Large investments in the postsecondary education system of the province also took place in the 1990s.

In the case of Alberta, the rapid influx of workers and their families into the province following the oil boom created new demand for investment in schools.

Chart 3
Large average age differences exist amongst provinces in education infrastructure in 2008



Source(s): Statistics Canada, special tabulation, Investment and Capital Stock Division.

Increased investment in education infrastructure by most provinces has contributed to the recent decline in the average age of education infrastructure at the national level. Two provinces did not follow the rejuvenation trend since the beginning of the 2000s: New Brunswick and Newfoundland and Labrador.

The average age of education buildings varies by province for several reasons such as demographic trends, economic conditions and provincial education policies. A relatively younger or older education infrastructure for a given province might reflect differences in a population's age structure and growth, in addition to differences due to other factors. However, it does not imply that the infrastructure is of better or lesser quality.

Another factor affecting the distribution and evolution of the average age of education buildings across provinces is the relative importance of the various categories of education institutions. Nationally, the gross value of stock was highest for elementary and secondary schools, followed by universities, then colleges in 2008. This was not always the case at the provincial level.

For example, among all provinces, Newfoundland and Labrador had the lowest proportion of infrastructure stock at the elementary and secondary level in 2008. Its college network represented the second largest infrastructure stock in the province and it was also the largest proportion across all provinces.

Above all, education is a provincial responsibility under the Constitution and provincial governments have their own needs and priorities in terms of infrastructure investments.[11] Moreover, the roles and responsibilities of school boards regarding investment and maintenance of school buildings vary greatly by province.

For instance, some provinces have distinct school systems for English and French communities. Also, at the postsecondary level, some provinces do not maintain a full range of university faculties. As a consequence, many students must move to study in the program of their choice, creating an increased demand for infrastructure in the receiving provinces. These considerations must be taken into account in the interpretation of provincial differences in average age of education infrastructure.

10 Provincial perspective

10.1 Newfoundland and Labrador: An ageing university structure

Newfoundland and Labrador's education buildings are second oldest among the provinces. In 2008, their average age had reached 22.5 years, or 57% of their estimated useful life.

The province's college infrastructure continued to age due to lower investment since 1975; in 2008, it was the highest average age among colleges in Canada at 28.8 years. Also, the ageing of its university infrastructure followed a somewhat different pattern than in most other provinces.[12]

Newfoundland and Labrador's investment in its university infrastructure experienced a brief rejuvenating trend in the mid-1980s and the late 1990s thanks to strong investments. This province was the only one in which the gross stock in university infrastructure has aged in the most recent period. Even so, the average age of the university infrastructure in Newfoundland and Labrador was 18.9 years in 2008, just above the national average of 18.0.

In 2008, Newfoundland and Labrador had the lowest percentage of all provinces of its population in the age group 5 to 17. The province has experienced negative rates of growth in this age group for at least three decades. Despite this, average yearly investment since 2000 in elementary and secondary schools, as a percentage of gross stock, was 3.3%, just above the national average of 3.0%. As a result, the average age of elementary and secondary schools remained below the national average at 20.0 years in 2008.

11 It should also be mentioned that the federal government supports the provinces and territories in matters of public infrastructure through fiscal transfers and other national programs. It also carries direct responsibility for Indian and Inuit schools and provides direct grants to universities for research laboratories.

12 There is only one university in Newfoundland and Labrador which offers a full range of academic programs.

10.2 Prince Edward Island: Strong university investments lower average age

At 20.3 years or 51% of its estimated useful life, Prince Edward Island was fifth youngest among the provinces in terms of the average age of its education infrastructure in 2008. This occurred as a result of recent substantial investments in its university infrastructure.[13]

The age of university infrastructure reached a peak of 24.2 years in 2000; by 2008, it had dropped to less than half that, at 10.9 years. Major investments were behind this rejuvenating trend.

10.3 Nova Scotia: Investments in schools strongest among provinces

Nova Scotia, which had the oldest education infrastructure in 2000, reached an average age of 21.3 years or 54% of its estimated useful life in 2008. Investments in elementary and secondary schools, which were the strongest among all the provinces in the recent period, were primarily responsible for the reduction in age. The value of building permits issued for this type of infrastructure was relatively high in 1999 in the context of the provincial government entering into public and private partnership (P3) arrangements.[14]

Colleges in Nova Scotia were the second oldest in the country at 27.3 years. In addition, it was one of only two provinces, along with Newfoundland and Labrador, to experience a contraction of gross stock since 2000. A combination of a low rate of new investment along with a high rate of discarded investment was responsible for the contraction. Nova Scotia has a relatively large university education system which hosts many out-of-province students.

10.4 New Brunswick: An ageing education infrastructure

In 2008, New Brunswick's education infrastructure had reached 59% of its estimated useful life. With an average of 23.2 years of age, it was the oldest in the country, followed by Newfoundland and Labrador and Quebec. The rate of investment in New Brunswick has been less than needed to prevent education infrastructure from continuous ageing since 1970, when the average age was 8.7 years.

Growth of stock at the elementary and secondary levels slackened over the last five decades. Average annual growth in the 1960s was almost 14%, but was only about 1% in the 1990s and was almost stagnant since 2000. This may reflect the fact that the proportion of the province's population aged 5 to 17 has been below the national average since 1996. It had been consistently above the national average between 1971 and 1995.

Postsecondary infrastructure stock grew by 1.7% a year on average between 2000 and 2008. This was about twice the pace recorded during the 1980s and slightly higher than in the 1990s.

10.5 Quebec: Ageing of universities halted in the 1990s

Quebec's education infrastructure was third oldest among the provinces in 2008. Its average age was 21.7 years, or 55% of its estimated useful life. The average age closely followed the national trend up until the late 1980s.

During the 1990s, the average age of elementary and secondary school infrastructure in Quebec continued to increase, whereas the rate of growth at the national level first slowed, then subsequently rejuvenated, as a result of stronger investments in Ontario, Alberta and British Columbia.

Since 2000, Quebec was one of three provinces in which the value of gross stock in elementary and secondary schools has declined.[15] It is also in Quebec that the number of children aged 5 to 9 has decreased the most since

13. There is only one university in Prince Edward Island which offers a basic range of academic programs.
14. P3 arrangements are public-private partnerships. See Honourable William Gillis, *Budget Address, Province of Nova Scotia*, *www.gov.ns.ca/finance/site-finance/media/finance/Address_1997.pdf* (accessed July 30, 2009).
15. Quebec had a 2.1% decline in the value of gross stock in elementary and secondary schools from 2000 to 2008. Manitoba (-6.2%) and Saskatchewan (-0.5%) are the only other two provinces that also declined.

the beginning of the decade. Although investment growth in education infrastructure in Quebec was not as high as the national average, universities benefited from an increase in their portion of overall investment.

Since the millennium, Quebec universities increased their infrastructure investments, as the Government of Quebec launched several initiatives to support capital investments in universities.[16] These universities displayed a strong downward movement in average age which contributed to lowering the average age of university infrastructure stocks at the national level.

10.6 Ontario: Average age equal to the national average since 2005

The average age of Ontario's education infrastructure was equal to the national average at 20.1 years or 51% of its estimated useful life in 2008. This occurred only recently, as it was higher than the average between 1974 and 2004.

Between 2000 and 2008, the decline in average age in Ontario has been driven by changes at the university and elementary/secondary levels.

The largest diminution occurred in universities, thanks to strong investments in these facilities. This resulted in a decrease in the average age of university infrastructure from 24.4 years in 1999 to 19.2 in 2008.

This decline occurred while universities hosted a double cohort of secondary school students resulting from the elimination of the Ontario Academic Credit year. Combined with events in Quebec, this rapid increase in university investment in Ontario has contributed to the overall decline in the average age of education infrastructure in Canada.

The average age of elementary and secondary schools in Ontario declined 1.4 years from 2000 to 2008. This reduction contributed significantly to lowering the average age of education infrastructures in that province. The stock of elementary and secondary schools also increased 1.3% a year on average from 2000 and 2008. This occurred despite declining numbers of children aged 5 to 9 in the province during this period.

10.7 Manitoba: Ageing elementary and secondary schools

The average age of education infrastructure in Manitoba stood at 21.5 years or 54% of its estimated useful life in 2008. Elementary and secondary school infrastructure has been the oldest among the provinces since 1996; in 2008, the average age reached a peak of 25.2 years. Since the millennium, investment in these schools as a percentage of gross stock was, on average, one of the lowest among the provinces.

Investment in university infrastructure remained strong from the mid-1990s to 2008, which reduced the average age from 22.3 to 17.6 years.

10.8 Saskatchewan: Average age close to the national average

At an average age of 20.2 years or 51% of its estimated useful life, Saskatchewan' education infrastructure was similar to the national average in 2008. Although this was an improvement in average age from 2000, the province slipped from third to fourth youngest as a result of stronger investments in Ontario.

Between 2000 and 2008, the stock of education infrastructure in Saskatchewan grew by an average of 1.8% a year, led by gains at the university and college levels. University stock was up 4.5% annually, while college infrastructure rose 2.5% a year. Conversely, the stock of elementary and secondary school infrastructure declined an average 0.1% each year.

16. The Government of Quebec's credits for capital investments in education increased 7.8% a year on average between fiscal year 2000-2001 and fiscal year 2008-2009 (see Secrétariat du Conseil du trésor, *2009-2010 Expenditure Budget http://www.tresor.gouv.qc.ca/en/budget/09-10/index.asp* (accessed August 26, 2009)). For initiatives related to universities, see Ministère de l'Education, du Loisir et du Sport, *Financement et mesures budgétaires et fiscales, http://www.mels.gouv.qc.ca/ens-sup/ens-univ/finances-univ.asp* (accessed August 26, 2009).

10.9 Alberta: Education infrastructure second youngest in the country

Alberta had the second youngest education infrastructure in 2008 in Canada. A high average level of investment during the 2000s, compared with the previous decade, lowered the average to 18.8 years, or 48% of its estimated useful life in 2008. Higher investments at all three levels of education contributed to the downward trend.

Demand for investment in education infrastructure was due to population growth, the fastest among the provinces since 2000. Alberta's population rose 2.2% annually, more than two times the national average of 1.0% from 2000 to 2008. Much of Alberta's gain was from net inter-provincial migration, which accounted for about one third of the growth.

Average annual growth in gross stock of education infrastructure for the elementary/secondary and college levels in Alberta was 2.7% between 2000 and 2008, more than twice the national average of 1.1%. Although growth at the university level in the province was less than the national average since 2000, it was strong in 2007 and 2008, averaging 4.8% annually compared with 3.1% nationally.

10.10 British Columbia: Youngest education infrastructure in the country

British Columbia had the youngest education infrastructure in Canada in 2008, with an average age of 17.3 years or 44% of useful life. It was followed by Alberta and Ontario.

In British Columbia, the average age of education infrastructure peaked in 1990, much earlier than in the other provinces; the age then declined until 1996 and fluctuated between 16.8 years and 17.7 during the following 10 years.

British Columbia renewed investments in education infrastructure sooner than the other provinces, most likely to accommodate large cohorts of international immigrants and migrants from other provinces. From 1991 to 1996, British Columbia saw the strongest increase in the number of children under 15, due in large measure to interprovincial and international migration.[17]

In the 10 years between 1988 and 1998, the average growth rate in British Columbia in the age group 5 to 17 was 2.4% compared with the Canadian average of 1.0%. In the following 10-year period, from 1998 to 2008, this age group declined 0.6% in British Columbia, compared with a 0.3% decline nationally.

Investments continued to be strong enough, particularly in universities and colleges, to maintain a relatively constant age in the following years. This came from large investments at the postsecondary level to increase access to university education. A new university was created in the northern part of the province; many colleges received degree-granting status in the 1990s, with associated operating and capital funding.[18]

A closer look at the individual infrastructure types in British Columbia reveals that strong investments in all three types contributed to the decline in average age in the first half of the 1990's. All three types increased slowly in the second half of the 1990's. Since the millennium, elementary and secondary schools continued to increase slowly in age. On the other hand, universities began another downward trend in 2002 followed by colleges in 2004.

17 See Statistics Canada, "Age and sex, 1996 Census," *The Daily*, July 29, 1997, Statistics Canada catalogue no. 11-001E, *http://www.statcan.gc.ca/daily-quotidien/970729/dq970729-eng.htm*, Ottawa.

18 See Klarka Zeman, "If you build it, they will come: The impact of new university on local youth," *Education Matters: Insight on Education, Learning and Training in Canada*, Statistics Canada Catalogue no. 81-004-X, vol. 3, no. 5, February 2007, *http://www.statcan.gc.ca/pub/81-004-x/2006005/9589-eng.htm*, Ottawa.

11 Summary tables

Table 2
Average age of education infrastructure by province and education level, 2008

	Elementary and secondary schools	Colleges	Universities	Total
	years			
Canada [1]	**21.0**	**19.3**	**18.0**	**20.1**
Newfoundland and Labrador	20.0	28.8	18.9	22.5
Prince Edward Island	20.9	4.2	10.9	20.3
Nova Scotia	20.0	27.3	20.7	21.3
New Brunswick	23.9	16.8	21.0	23.2
Quebec	24.2	20.0	16.9	21.7
Ontario	20.2	19.5	19.2	20.1
Manitoba	25.2	25.9	17.6	21.5
Saskatchewan	24.0	18.5	17.3	20.2
Alberta	19.1	17.1	19.1	18.8
British Columbia	18.4	14.9	15.2	17.3

1. Yukon, the Northwest Territories and Nunavut are included in the Canada total.
Source(s): Statistics Canada, special tabulation, Investment and Capital Stock Division.

Table 3
Shares and value of education infrastructure's gross capital stock in 2002 constant dollars by province and education level, 2008

	Elementary and secondary schools	Colleges	Universities	Total [1]
	percent of total			millions of 2002 dollars
Canada [2]	**61**	**10**	**24**	**115,484**
Newfoundland and Labrador	46	28	18	1,899
Prince Edward Island	46	4	18	628
Nova Scotia	55	10	30	3,213
New Brunswick	73	2	18	2,714
Quebec	59	12	24	25,774
Ontario	67	6	24	42,159
Manitoba	51	7	23	3,955
Saskatchewan	47	11	28	4,735
Alberta	58	13	24	13,767
British Columbia	61	11	24	15,272

1. Total includes elementary and secondary schools, colleges, universities and all other education buildings.
2. Yukon, the Northwest Territories and Nunavut are included in the Canada total.
Source(s): Statistics Canada, special tabulation, Investment and Capital Stock Division.

Table 4
Average age of education infrastructure as a percent of useful life by province and education level, 2008

	Elementary and secondary schools	Colleges	Universities	Total
	percent			
Canada [1]	**53**	**49**	**45**	**51**
Newfoundland and Labrador	51	73	48	57
Prince Edward Island	53	11	28	51
Nova Scotia	51	69	52	54
New Brunswick	60	42	53	59
Quebec	61	51	43	55
Ontario	51	49	49	51
Manitoba	64	65	44	54
Saskatchewan	61	47	44	51
Alberta	48	43	48	48
British Columbia	47	38	38	44

1. Yukon, the Northwest Territories and Nunavut are included in the Canada total.
Source(s): Statistics Canada, special tabulation, Investment and Capital Stock Division.

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